

## Claims

Having described the invention that which is claimed is:

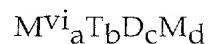
1. A release composition comprising

(A) the reaction product of:

- 1)  $\text{R}^{\text{E}}_{\text{h}}\text{Si}(\text{OR}^{\text{A}})_{3-\text{h}}$ ;
- 2)  $\text{R}^{\text{vi}}_{\text{i}}\text{Si}(\text{OR}^{\text{B}})_{3-\text{i}}$ ;
- 3) a condensation catalyst; and
- 4) water

where  $\text{R}^{\text{E}}$  is an oxirane or epoxide containing radical having from one to forty carbon atoms,  $\text{R}^{\text{vi}}$  is selected from the group consisting of two to forty carbon atom terminal olefinic monovalent hydrocarbon radicals,  $\text{R}^{\text{A}}$  is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals;  $\text{R}^{\text{B}}$  is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals, where h varies from 1 to 3 and where i varies from 1 to 3 and

(B) a curable alkenyl silicone having the formula



where

$\text{M}^{\text{vi}} = \text{R}_{3-\text{p}}\text{R}^1_{\text{p}}\text{SiO}_{1/2}$ , where R is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals and  $\text{R}^1$  is selected from the group consisting of two to forty carbon atom terminal olefinic monovalent hydrocarbon radicals, where p ranges from 1 to 3;

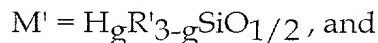
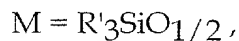
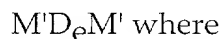
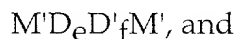
$T = R^2SiO_{3/2}$  where  $R^2$  is selected from the group consisting of R and  $R^1$ ;

$D = R^3R^4SiO_{2/2}$  where  $R^3$  and  $R^4$  are each independently selected from the group consisting of R and  $R^1$ ; and

5  $M = R_3SiO_{1/2}$  where each R is as previously defined and is independently selected; wherein a and b have values ranging from 2 to 5,

c is an integer ranging from about 50 to about 1,000 and d has a value ranging from 0 to about 0.5.

2. The composition of claim 1 additionally comprising a hydrogen siloxane selected from the group of compounds:

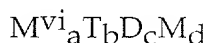


20  $D' = R'HSiO_{2/2}$  wherein each  $R'$  in M,  $M'$ , D, and  $D'$  is independently selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals wherein the subscripts e and f may be zero or positive whereby the sum of e and f ranges from about 10 to about 100 subject to the limitation that the sum of f and g is two or greater.

3. The composition of claim 1 wherein the condensation catalyst is formic acid.
4. The composition of claim 1 wherein the condensation catalyst is an organo tin compound.
5. The composition of claim 3 where R is methyl, trifluoropropyl or phenyl and R<sup>1</sup> is selected from the group consisting of two to ten carbon atom alkenyl groups.
6. The composition of claim 4 where R' is methyl, trifluoropropyl or phenyl.
7. The composition of claim 5 wherein the subscripts a, b, and d satisfy the relationship  $a + d > b$ .
8. The composition of claim 6 wherein the viscosity ranges from about 100 to about 10,000 centipoise.
9. The composition of claim 6 wherein the viscosity ranges from about 125 to about 1,000 centipoise.
10. An aqueous emulsion comprising the composition of claim 8.
- 5 11. A curable release composition comprising:
  - (A) the reaction product of:
    - 1)  $R^{E_h}Si(OR^A)_{3-h}$ ;
    - 2)  $R^{v_i}Si(OR^B)_{3-i}$ ;
    - 3) a tin condensation catalyst; and
    - 4) water

where  $R^E$  is an oxirane or epoxide containing radical having from one to forty carbon atoms,  $R^v$  is selected from the group consisting of two to forty carbon atom terminal olefinic monovalent hydrocarbon radicals,  $R^A$  is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals;  $R^B$  is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals, where h varies from 1 to 3 and where i varies from 1 to 3.

(B) an alkenyl silicone having the formula:



where

$M^{vi} = R_{3-p}R^1_pSiO_{1/2}$ , where R is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals and  $R^1$  is selected from the group consisting of two to forty carbon atom olefinic monovalent hydrocarbon radicals, where p ranges from 1 to 3;

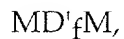
$T = R^2SiO_{3/2}$  where  $R^2$  is selected from the group consisting of R and  $R^1$ ;

$D = R^3R^4SiO_{2/2}$  where  $R^3$  and  $R^4$  are each independently selected from the group consisting of R and  $R^1$ ; and

$M = R_3SiO_{1/2}$  where each R is as previously defined and is independently selected; wherein a and b have values ranging from 2 to 5,

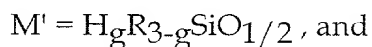
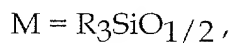
c is an integer ranging from about 50 to about 1,000 and d has a value ranging from 0 to about 0.5;

(C) a hydrogen siloxane selected from the group of compounds:



5  $\text{M}'\text{D}_e\text{D}'_f\text{M}'$ , and

$\text{M}'\text{D}_e\text{M}'$  where



10  $\text{D}' = \text{RHSiO}_{2/2}$  wherein each R in M, M', D, and D' is independently selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals wherein the subscripts e and f may be zero or positive whereby the sum of e and f ranges from about 10 to about 100 subject to the limitation that the sum of f and g is two or greater;

15 (D) a hydrosilylation catalyst; and

(E) an inhibitor.

12. The composition of claim 10 wherein the hydrogen siloxane is selected from the group consisting of



20  $\text{MD}'_f\text{M},$

and mixtures thereof.

13. The composition of claim 11 where R is methyl, trifluoropropyl or phenyl and R<sup>1</sup> is selected from the group consisting of two to ten carbon atom alkenyl groups.

14. The composition of claim 12 where R' is methyl, trifluoropropyl or phenyl.

15. The composition of claim 13 wherein the subscripts a, b, and d satisfy the relationship  $a + d > b$ .

16. The composition of claim 14 wherein the viscosity ranges from about 100 to about 10,000 centipoise.

17. The composition of claim 15 wherein the viscosity ranges from about 125 to about 1,000 centipoise.

18. An aqueous emulsion comprising the composition of claim 16.

19. A curable paper release composition comprising

(A) the reaction product of:

1)  $R^E_hSi(OR^A)_{3-h};$

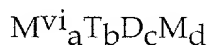
2)  $R^V_iSi(OR^B)_{3-i};$

3) a tin condensation catalyst; and

4) water

where  $R^E$  is an oxirane or epoxide containing radical having from one to forty carbon atoms,  $R^{vi}$  is selected from the group consisting of two to forty carbon atom terminal olefinic monovalent hydrocarbon radicals,  $R^A$  is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals;  $R^B$  is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals, where  $h$  varies from 1 to 3 and where  $i$  varies from 1 to 3;

(B) an alkenyl silicone having the formula:



where

$M^{vi} = R_{3-p}R^1_pSiO_{1/2}$ , where  $R$  is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals and  $R^1$  is selected from the group consisting of two to forty carbon atom olefinic monovalent hydrocarbon radicals, where  $p$  ranges from 1 to 3;

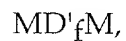
$T = R^2SiO_{3/2}$  where  $R^2$  is selected from the group consisting of  $R$  and  $R^1$ ;

$D = R^3R^4SiO_{2/2}$  where  $R^3$  and  $R^4$  are each independently selected from the group consisting of  $R$  and  $R^1$ ; and

$M = R_3SiO_{1/2}$  where each  $R$  is as previously defined and is independently selected; wherein  $a$  and  $b$  have values ranging from 2 to 5,

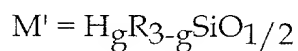
$c$  is an integer ranging from about 50 to about 1,000 and  $d$  has a value ranging from 0 to about 0.5;

(C) a hydrogen siloxane selected from the group of compounds:



5  $\text{M}'\text{D}_e\text{D}'_f\text{M}',$  and

$\text{M}'\text{D}_e\text{M}'$  where M is as previously defined and



$\text{D} = \text{RRSiO}_{2/2}$  where each R is independently selected and



10 where R is as previously defined, the subscripts e and f may be zero or positive wherein the sum of e and f ranges from about 10 to about 100 subject to the limitation that the sum of f and g is two or greater;

(D) a hydrosilylation catalyst; and

(E) an inhibitor.



20. The composition of claim 18 wherein the subscripts a, b, and d satisfy the relationship  $a + d > b$ ; wherein the hydrogen siloxane is selected from the group consisting of



and mixtures thereof; wherein R is methyl, trifluoropropyl or phenyl; wherein  $\text{R}^1$  is selected from the group consisting of two to ten carbon atom alkenyl groups; wherein R' is methyl, trifluoropropyl or phenyl; and wherein the viscosity ranges from about 125 to about 1,000 centipoise.

21. An aqueous emulsion comprising the composition of claim 19.

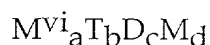
22. A curable paper release composition consisting essentially of

(A) The release compositions of the present invention comprise additives for improved anchorage of release coatings comprising the reaction product of:

- 1)  $\text{R}^E_h\text{Si}(\text{OR}^A)_{3-h};$
- 2)  $\text{R}^v_i\text{Si}(\text{OR}^B)_{3-i};$
- 3) a tin condensation catalyst; and
- 4) water

where  $R^E$  is an oxirane or epoxide containing radical having from one to forty carbon atoms,  $R^V$  is selected from the group consisting of two to forty carbon atom terminal olefinic monovalent hydrocarbon radicals,  $R^A$  is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals;  $R^B$  is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals, where h varies from 1 to 3 and where i varies from 1 to 3;

(B) an alkenyl silicone having the formula:



where

$M^{Vi} = R_{3-p}R^1_pSiO_{1/2}$ , where R is selected from the group consisting of one to forty carbon monovalent hydrocarbon radicals and  $R^1$  is selected from the group consisting of two to forty carbon atom olefinic monovalent hydrocarbon radicals, where p ranges from 1 to 3;

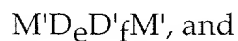
$T = R^2SiO_{3/2}$  where  $R^2$  is selected from the group consisting of R and  $R^1$ ;

$D = R^3R^4SiO_{2/2}$  where  $R^3$  and  $R^4$  are each independently selected from the group consisting of R and  $R^1$ ; and

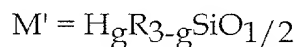
$M = R_3SiO_{1/2}$  where each R is as previously defined and is independently selected; wherein a and b have values ranging from 2 to 5,

c is an integer ranging from about 50 to about 1,000 and d has a value ranging from 0 to about 0.5;

(C) a substantially linear hydrogen siloxane selected from the group of compounds:



$\text{M}'\text{D}_e\text{M}'$  where M is as previously defined and



$\text{D} = \text{RRSiO}_{2/2}$  where each R is independently selected and



where R is as previously defined, the subscripts e and f may be zero or positive wherein the sum of e and f ranges from about 10 to about 100 subject to the limitation that the sum of f and g is two or greater;

(D) a hydrosilylation catalyst; and

15 (E) an inhibitor.

23. A laminate having a substrate and a coating said coating comprising the composition of claim 1.

24. The laminate of claim 23 wherein the substrate is selected from the group consisting of paper and polymeric films said polymeric films selected  
20 from the group consisting of polyethylene, polypropylene, and polyester.